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# Role of Ayurvedic herbs in managing Urinary System Diseases: A Review

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## ABSTRACT

The urinary system plays a crucial role in eliminating waste and maintaining fluid balance in the body. However, various factors such as lifestyle, dietary habits and genetic predisposition can lead to urinary system diseases, ranging from urinary tract infections (UTIs) to more severe conditions like kidney stones and chronic kidney disease. *Ayurveda*, an ancient Indian system of medicine, emphasizes the balance of bodily systems through diet, lifestyle modifications and herbal remedies. According to *Ayurveda*, urinary system diseases are often manifestations of imbalances in the body's *Doshas Vata, Pitta* and *Kapha*. Herbal remedies are tailored to restore this balance and promote overall well-being rather than merely treating symptoms. This abstract explores the role of *Ayurvedic* herbs in managing urinary system diseases. *Ayurveda*, an ancient system of medicine offers a plethora of herbs known for their therapeutic properties in promoting kidney health, supporting urinary tract function and alleviating symptoms of various urinary disorders. Commonly used herbs include *Gokshura, Punarnava, Varuna, Pashanbhed, Bijaka, Bimbi, Karavellaka, Vata, Jambu* etc. each offering unique benefits such as diuretic, anti- urolithic, nephroprotective, anti-inflammatory and antimicrobial effects. Overall, *Ayurvedic* herbs present promising avenues for managing urinary system diseases and improving overall urinary health.

**Key words:** *Mutrakriccha, Mutraveerajneeya, Mutrasangrahaneeya, Mutravirechaneeya, Ashmari*

## INTRODUCTION

Urinary system disorders are prevalent health concerns affecting millions worldwide, often leading to discomfort & impaired quality of life. *Ayurveda* offer a wide range of holistic treatments covering preventive, promotive, curative, rehabilitative and rejuvenators needs. Whatever we eat it has to pass through various stages like absorption, distribution, metabolism and

excretion. Excretion is mainly done through urine, faeces, exhaled air, saliva, sweat and milk.

*Dosha Dhathu Mala Mulam Hi Shareeram, Dosha, Dhathu* and *Mala* are the basic substratum of the *Shareera* (Body).<sup>[1]</sup> *Mala* being one among them, *Acharya's* have given importance to their function and their different status in the body. *Mutra* is one among the *Trimala*<sup>[2]</sup> and it plays a major role in *Kledavahana*.

In *Ayurveda* various types of *Srotas* are mentioned. *Mutravahasrotas* is one of them. *Srotas* constitute the internal transport system of body specially related to the fine circulation and pathways carrying out all the vital functions of the body. When *Mutravahasrotas* are vitiated due to various causes like *Mutravegadharana*, injury to urinary bladder, urethera, *Basti Vyapada* etc. it leads to development of various diseases of *Mutravahasrotas* like *Atishrishtam Mutra* (polyuria), *Atibaddham Mutra* (anuria), *Prakupit Mutra* (frequent micturation), *Alpa-Alpa Mutra* (oliguria), *Sashool Yukt Mutra* (dysuria), *Bahul Mutra* (frothy urine). This

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review explores the role of Ayurvedic herbs in addressing urinary system diseases, focusing on their mechanisms of action & clinical efficacy.

**Urinary disorders mentioned in Brihatrayi**

Roga (Diseases)	No. of Roga
Mutrakriccha	08
Mutraghata	13
Ashmari	04
Prameha	20
Mutrakshaya	01
Mutravidhi	01
Total	47

**Herbs for managing Urinary System Diseases**

- Mutravirechaneeya Dravya
- Madhumehahara Dravya
- Ashmaribhedana Dravya
- Mutraveerajneeya Dravya
- Mutrasangrahaneeya Dravya

**DISCUSSION**

**Mutravirechaneeya Dravya**

Plants of Mutravirechaneeya Mahakashaya, described as 35<sup>th</sup> Mahakashaya in the 4<sup>th</sup> chapter of Charaka Samhita, Purvardha are mostly recognized for their urine inducing or urinary flow increasing capacity along with urinary system defending property in the ancient Ayurvedic medical science. Mutravirechaneeya Mahakashaya by Acharya Charaka is found to cure effectively urinary disorders like incomplete emptying, various urinary tract infections and urinary tract calculi with some herbs having the properties to preserve renal function. Acharaya Priyavrat Sharma also mentioned Mutravirechaneeya Dravya in his book Dravyaguna Vijnana (II).

**Table 1: List of Dravya that act as Mutravirechaneeya<sup>[3,4]</sup>**

SN	Dravya name	Latin name	Rasa	Guna	Vipaka	Veerya
1.	Gokshura	Tribulus terrestris	Madhura	Guru, Snigdha	Madhura	Sheeta
2.	Kusha	Desmostachya bipinnata	Madhura, Kashaya	Laghu, Snigdha	Madhura	Sheeta
3.	Kasa	Saccharum spontaneum	Madhura, Kashaya	Laghu, Snigdha	Madhura	Sheeta
4.	Sara	Saccharum munja	Madhura, Tikta	Laghu, Snigdha	Madhura	Sheeta
5.	Ikshu	Saccharum officinarum	Madhura	Guru, Snigdha	Madhura	Sheeta
6.	Bhumyama laki	Phyllanthus urinaria	Madhura, Tikta, Kashaya	Laghu, Rooksha	Madhura	Sheeta
7.	Kankola	Piper cubeba	Katu, Tikta	Laghu, Rooksha, Tiktsna	Katu	Ushna
8.	Hapusha	Juniperus communis	Katu, Tikta	Laghu, Rooksha, Tiktsna	Katu	Ushna
9.	Ananasa	Ananas comosus	Madhura (Ripe fruit), Amla (Unripe fruit)	Guru, Snigdha	Madhura	Sheeta
10.	Trapusha	Cucumis sativus	Madhura	Laghu, Rooksha	Madhura	Sheeta
11.	Vrikshadani (Vandaka)	Dendrophoe falcata	Madhura, Tikta	Laghu, Rooksha	Katu	Sheeta

			Kashaya			
12.	Vasuk (Punarnava)	Boerhavia diffusa	Madhura, Tikta Kashaya	Laghu, Rooksha	Madhura	Ushna
13.	Vashir	Achyranthes aspera	Katu, Tikta	Laghu, Rooksha Tiksna	Katu	Ushna
14.	Pashanbhed	Bergenia ligulata	Kashaya, Tikta	Laghu, Snigdha, Tiksna	Katu	Sheeta
15.	Darbh	Imperata cylindrica	Madhura, Kashaya	Laghu, Snigdha	Madhura	Sheeta
16.	Gundra	Typha australis	Madhura, Kashaya	Guru	Madhura	Sheeta
17.	Itkatmool (Sharmool)	Sesbania bispinosa	Madhura	Guru, Snigdha	Madhura	Sheeta

**Ashmaribhedana Dravya**

Ashmari (calculi) comprises of two words i.e., Ashma and Ari. Ashma means a stone and Ari means enemy. Mutrashmari (urolithiasis), is a disease of Mutravahasrotas (urinary tract) and involves formation of stone, resulting into severe pain as given by enemy. Herbs that break the formed stones, expel it from the body and prevent further formation of stones are known as Ashmaribhedana Dravya.

**Table 2: List of Dravya that act as Ashmaribhedana<sup>[5]</sup>**

SN	Dravya name	Latin name	Rasa	Guna	Vipaka	Veerya
1.	Pashanabheda	Bergenia ligulata	Kashaya, Tikta	Laghu, Snigdha, Tiksna	Katu	Sheeta
2.	Varuna	Crataeva nurvala	Tikta, Kashaya	Laghu, Rooksha	Katu	Ushna
3.	Kulattha	Dolichos biflorus	Kashaya	Laghu, Rooksha, Tiksna	Amla	Ushna

4.	Veertru	Dichrostachys cineraria	Tikta, Kashaya	Laghu, Rooksha	Katu	Ushna
5.	Gorakshaganja	Aerva lanata	Tikta, Kashaya	Laghu, Tiksna	Katu	Ushna

**Mutrasangrahaneeya Dravya**

The drugs which help to restore normal quantity of urine (anti-diuretics) are called *Mutra- Sangrahaneeya Dravya*. *Mutrasangrahaneeya Mahakashaya* is given in *Charaka Samhita*. *Acharaya Priyavrat Sharma* also mentioned *Mutrasangrahaneeya Dravya* in his book *Dravyaguna Vijnana (II)*.

**Table 3: List of Dravya that act as Mutrasangrahaneeya<sup>[6,7]</sup>**

SN	Dravya name	Latin name	Rasa	Guna	Vipaka	Veerya
1.	Jambu	Syzygium cumini	Kashaya, Madhura, Amla	Laghu, Rooksha	Katu	Sheeta
2.	Amra	Mangifera indica	Kashaya	Laghu, Rooksha	Katu	Sheeta
3.	Vata	Ficus bengalensis	Kashaya	Guru, Rooksha	Katu	Sheeta
4.	Udumbara	Ficus glomerata	Kashaya	Guru, Rooksha	Katu	Sheeta
5.	Ashvatha	Ficus religiosa	Kashaya, Madhura	Guru, Rooksha	Katu	Sheeta
6.	Plaksha	Ficus lacor	Kashaya	Guru, Rooksha	Katu	Sheeta
7.	Sala	Shorea robusta	Kashaya (Twak), Kashaya, Madhura (Rala)	Rooksha	Katu	Sheeta

8.	Sarja	Vateria indica	Kashaya (Twak) Kashaya, Madhura (Rala)	Rooksha	Katu	Sheeta
9.	Dhava	Anogeissus latifolia	Kashaya	Laghu, Rooksha	Katu	Sheeta
10.	Tinisha	Ougenia oojainensis	Kashaya	Laghu, Rooksha	Katu	Sheeta
11.	Ashmantaka	Ficus rumphii	Kashaya	Laghu, Rooksha	Katu	Sheeta
12.	Vikantaka	Flacourtia ramontchii	Tikta, Madhura, Amla, Kashaya (Phala)	Laghu, Rooksha	Katu	Sheeta
13.	Kapeetana	Thespesia populnea	Kashaya	Laghu, Rooksha	Katu	Sheeta
14.	Bhallatak	Semecarpus anacardium	Katu, Tikta, Kashaya	Laghu, Snigdha, Tiksna	Madhura	Ushna
15.	Somvalkala	Acacia suma	Tikta, Kashaya	Laghu, Rooksha	Katu	Sheeta

**Madhumehahara Dravya**

The term Diabetes means that a condition in which a large volume of urine is passed and Mellitus means sweet. It is characterized by polyuria, polydipsia, polyphagia, fatigue etc. In Ayurveda Diabetes Mellitus significantly resembles with Madhumeha. All Prameha if not treated properly, may be converted to Madhumeha (DM) in due course of time. It is a Tridoshaja condition with dominance of Kapha and Dushya involved in it are Meda, Mamsa, Kleda, Shukra, Shonita, Vasa, Majja, Lasika, Rasa and Oja. The drugs which are useful in treating Madhumeha are called Madhumehahara Dravya.

**Table 4: List of Dravya that act as Madhumehahara<sup>[8]</sup>**

SN	Dravya Name	Latin Name	Rasa	Guna	Vipaka	Veerya
1.	Bijaka	Pterocarpu s marsupium	Kashaya, Tikta	Laghu, Rooksha	Katu	Sheeta
2.	Karavellaka	Momordia charantia	Tikta, Katu	Laghu, Rooksha	Katu	Ushna
3.	Saptachakra	Salacia chinensis	Kashaya, Tikta	Laghu, Rooksha Tiksna	Katu	Ushna
4.	Bimbi	Coccinia indica	Tikta	Laghu, Rooksha Tiksna	Katu	Ushna

**Mutraveerajneeya Dravya (Urinary pigment normalizers)**

Acharya Charaka in Shadvirechanasataasriteeyam Adhyayam has mentioned Mutraveerajneeya Mahakashaya. The term Virajana means providing colour to something. Hence Mutraveerajneeya Mahakashaya will be capable of correcting the colour i.e., in bringing back the Prakruta Varna to Mutra.

*Dosha Dushtam Mutram Viranjayitva Prakrtauv Sthapayati Tad Mutravirajaneeyam<sup>[9]</sup>*

Dravyas, which reduce the Dosha Dushti and bring about normal Varna to Mutra, are known as Mutravirajaneeya Dravyas. In some conditions like Agnimandya and Amajeerna, the Pachana of Ahara and subsequent Sara Kitta Vibhajana do not take place properly leading to improper formation of urine or discolored urine. In conditions like Kamala, Pandu, Haridrameha, Manjishtameha due to Srotavarodha and Dosha Dushti urine becomes discolored.

**Table 5: List of Dravya that act as Mutraveerajneeya<sup>[10]</sup>**

SN	Dravya Name	Latin Name	Rasa	Guna	Vipaka	Veerya
1.	Padm (Ishat Shwet Kamal)	Nelumbo nucifera	Madhura, Tikta, Kashaya	Laghu, Snigdha,	Madhura	Sheeta

				Picchil a		
2.	Utpal (Ishat Neel Kumud)	Nymphaea stellata	Madhur a, Tikta, Kashaya	Laghu, Snigdha, a, Picchil a	Madhur a	Sheet a
3.	Nalin (Ishat Rakt Kamal)	Nelumbo nucifera (Var.Nympha ea)	Madhur a, Tikta, Kashaya	Laghu, Snigdha, a, Picchil a	Madhur a	Sheet a
4.	Kumud	Nymphaea nouchali	Madhur a, Tikta, Kashaya	Laghu, Snigdha, a, Picchil a	Madhur a	Sheet a
5.	Sogandhik (Rakt Kumud)	Nymphaea rubra	Madhur a, Tikta, Kashaya	Laghu, Snigdha, a, Picchil a	Madhur a	Sheet a
6.	Pundreek (Shwet Kamal)	Nelumbo nucifera (Var.Nympha ea)	Madhur a, Tikta, Kashaya	Laghu, Snigdha, a, Picchil a	Madhur a	Sheet a
7.	Shatpatra	Nelumbo nucifera (Var.Nympha ea)	Madhur a, Tikta, Kashaya	Laghu, Snigdha, a, Picchil a	Madhur a	Sheet a
8.	Madhuk	Glycyrrhiza glabra	Madhur a	Guru, Snigdha a	Madhur a	Sheet a
9.	Priyangu	Callicarpa macrophylla	Madhur a, Tikta, Kashaya	Guru, Rooksh a	Katu	Sheet a
10.	Dhatkipush pa	Woodfordia fruticosa	Kashaya	Laghu, Rooksh a	Katu	Sheet a

**Probable mode of action & experimental evidence of some herbs**

**1) Probable Mode of Action of Mutravirechaneeya Dravya**

Yat Dravyam Mutrasya Atipravartanam Karoti Tat Mutravirechaneeyam<sup>[11]</sup>

The Dravyas which increases the urine formation are called *Mutravirechneeya Dravya*. As most of the Dravya are *Madhura Rasa* and *Sheeta Guna* they increase the *Jaliyansha*. Increase in formation of *Jaliyansha* leads to urine formation.

- As we know drugs which increase the formation of *Mutra* are predominant in *Jala (Sheeta Veerya)* e.g., *Goksura, Kusha, Kasa, Sara, Ikshu, Bhumyamalaki, Vandaka, Tripusha, Pashanbhed* and *Agni (Ushna Veerya) Mahabhoot* e.g., *Punarnava, Kankola, Hapusha, Vashir*. So, both *Ushna Veerya* and *Sheeta Veerya* drugs cause diuresis.
- Sheeta Veerya* due to predominance of *Jala Mahabhoot* increases the water content in the *Mutra* and decreases the reabsorption of water in the convoluted tubules & DCT.
- Ushna Veerya (Aganya Dravya)* increases the pressure in the afferent arteriole of the kidney and nephrons thereby increases the GFR, ultimately when GFR increase the urine formation also increases. *Aganya Dravya* also causes diuresis by causing irritation in the kidney.

**Experimental evidence of Mutravirechaneeya Dravya**

**1. Vrikshadani (Dendrophthoe falcata)**

**Diuretic activity, Urinary stone formation preventing capacity**

Preparation of active ingredient of *Dendrophthoe falcata* in the medium of water and alcohol were investigated to establish its calculi destroying capacity and aqueous preparation was experienced for urinary output enhancing capacity. When aqueous preparation of active ingredient (4 g/kg p.o.) was tested in rats and comparison made with furosemide (4 mg/kg) and hydrochlorthiazide (10 mg/kg), it showed considerable enhancement of urinary output with increased secretion of excess salts was observed. The animals in which extraction of active principle of the experiment drug (4 g/kg, p.o.) in water and alcoholic medium, there was noticed significant decrease in the weight of magnesium ammonium phosphate stones, caused by setting in zinc disc in the urinary bladder of rats

compared to control group managed by ethylene glycol.<sup>[12]</sup>

## 2. Gokshura (*Tribulus terrestris*)

### Diuretic activity

*Gokshura* contain potassium alkali. Watery extract of *Gokshura* possesses similar diuretic activity like urea both in rats and dogs. The diuresis is due to the potassium content of the extract.<sup>[13]</sup>

### Antirolithiatic activity

Glycolate oxidase (GOX) which is one of the main enzymes required for oxalate formation is prevented by *Tribulus terrestris* and its antirolithiatic activity is attributed to this property. The inhibition of glycolate oxidase was due to the effective ingredients of *Tribulus terrestris* namely quercetin and kaempherol which were evaluated to be its non-competitive and competitive inhibitors respectively.<sup>[14]</sup>

## 3. Vasuka (*Boerhavia diffusa* Linn)

### Diuretic activity

It was found that  $\beta$ -ecdysone extracted from the root of *Boerhavia diffusa* is responsible for its diuretic potential.<sup>[15]</sup>

## 4. Vashira (*Achyranthes aspera*)

### Nephroprotective activity

The roots are found effective in preventing calcium oxalate crystallization and its growth tested in a test tube and also effective on renal tubular epithelial cell injury in rats.<sup>[16]</sup>

### Diuretic activity

Elevated diuretic efficacy was found in male rats from the *Achyranthes aspera* entire plant methanolic extract as evaluated by Saurabh Srivastav and coworkers.<sup>[17]</sup>

## 5. Pashanbheda (*Bergenia ligulata*)

### Antirolithiatic activity

- Considerable decomposition of renal stone both in renal and urine component was observed from methanolic extract of *Bergenia ligulata* and bergenin.<sup>[18]</sup>
- *Bergenia ligulata* rhizome inhibited calcium oxalate crystal aggregation as well as crystal

formation, diuretic and antioxidant action of *Bergenia ligulata* are supposed to be responsible for its antirolithiatic action.<sup>[19]</sup>

## 6. Darva (*Imperata cylindrica*)

### Diuretic activity

Dubey, S.D. et al. (1985) have been studied the pharmacology of *I. cylindrica* in experimental albino rats and reported to have significant diuretic, natriuretic and Kaluretic actions.<sup>[20]</sup>

## 7. Kusha (*Desmostachya bipinnata*)

### Diuretic activity

Considerable diuretic action and improved urinary output compared to furosemide ( $P < 0.01$ ) was observed for the hydroalcoholic extract of *Desmostachya bipinnata*. Urinary electrolytes levels ( $\text{Na}^+$ ,  $\text{K}^+$ , and  $\text{Cl}$ ) are also enhanced with this.<sup>[21]</sup>

### Antirolithiatic activity

Considerable fall in the amount of renal calcium oxalate accumulation was observed in urinary calculi formation caused test group rats in case of active ingredient extraction of *Desmostachya bipinnata* in water medium. Calcium oxalate stone formation caused chemical processes in living things were also setback by it.<sup>[22]</sup>

### Antimicrobial activity

Significant antimicrobial activities were noticed from the important oil extracted from the aerial parts of *Desmostachya bipinnata* against various bacterial pathogens like *S. aureus*, *S. epidermis*, *E. coli* etc.<sup>[23]</sup>

## 8. Kasa (*Saccharum spontaneum* Linn.)

### Antirolithiatic activity

Ethanollic root extract of *S. spontaneum* has curative effect on stone formation induced by ethylene glycol.<sup>[24]</sup>

## 9. Gundra (*Typha australis*)

### Antirolithiatic activity

Roots decoction: To boil 3–6 g of dried roots in 1L of water to use 125 ml OD till stone expulsion.<sup>[25]</sup>

**Diuretic activity**

*Gundra* is studied to be as *Sheeta Veerya* (cooling potency), *Mutrajanak* (diuretic), and *Pittashamak* (alleviates *Pitta*) in character.<sup>[26]</sup>

**10. Sara (*Saccharum munja Roxb*)****Antibacterial activity**

Active ingredient extraction from leaf and stem of *Saccharum munja* was found to be antimicrobial against gram negative *E. coli*. A large extent of inhibitory effect was noticed from leaf and stem extract.<sup>[27]</sup>

**Diuretic and antiurolithiatic activity**

It is applied in urinary calculi cases for its *Sheeta Veerya* (cold potency) and *Mutrajanan* (diuretic) qualities.<sup>[28]</sup> In a study roots possess antioxidant and leaves have lithotriptic properties.<sup>[29,30]</sup>

**II) Probable mode of action of *Mutrasangraheeya Dravya***

*Ati Pravrttam Mutram Yat Sangrhaati Tat Mutrasangraheeyanam*<sup>[31]</sup>

- These *Dravyas* cause stoppage of excess *Mutrapravritti* rather than altering the normal quantity, and are hence utilized in *Kleda Pradhana Vyadhi* like *Prameha*, *Shayyamu* where *Mutra Atipravritti* is seen. The main symptom of *Prameha* is *Prabhoot Avil Mutrata*, so by *Mutrasangraheeya* action these drugs help to treat *Prameha* and *Madhumeha* (diabetes). In such diseases medications that are *Kledashoshaka*, *Shleshmedohara*, *Pramehaghna* and *Shleshmavatahara* are required. These functions are carried out efficiently by the *Mutrasangraheeya Dravyas*.
- Most of them are *Tikta*, *Kashaya Rasa* and *Ruksha Guna Pradhana* e.g., *Jambu*, *Amra*, *Vata*, *Udumbra*, *Ashvattha*, *Plaksha*, *Sala*, *Sarja*, *Dhava*, *Tinisha*, *Ashmantaka*, *Vikankata*, *Kapeetana*. Due to *Kashaya Rasa* they decrease the secretions in the tubule of the kidney because *Kashaya Rasa* has astringent effect. Due to its *Ruksha Guna* they decrease the *Kleda* in the body ultimately decrease the urine formation.

**Experimental evidence of *Mutrasangraheeya Dravya***

The drugs of *Mutrasangraheeya Mahakashaya* are advised or prescribed in the various ailments of urinary system like *Prameha*, *Shayyamu* etc. These herbs are also helpful in other diseases like *Atisara*, *Grahani*, *Raktapitta* etc. which have *Atipravritti (Bahirgaman)* of *Jaliyansha* from the body. They help in rectifying *Atipravritti* of *Mutra* by directly and indirectly.

**1. Amra (*Mangifera indica*)****Hypoglycaemic activity**

The effect of the aqueous extract of the leaves on blood glucose level in normoglycaemic, glucose induced hyperglycaemic and streptozotocin (STZ) induced diabetic rats has been assessed. The results indicate that the aqueous extract of the leaves of *Mangifera indica* possess hypoglycaemic activity. This action may be due to an intestinal reduction of the absorption of glucose.<sup>[32]</sup>

**2. Somvalkala (*Acacia suma*)****Hypoglycaemic activity**

The roots of *Acacia suma* possess the hypoglycaemic activity.<sup>[33]</sup>

**3. Bhallatak (*Semecarpus anacardium*)****Hypoglycaemic activity**

Arul et al. studied the effect of ethanolic extract of dried nuts of *Bhallatak* on blood glucose and investigated in both normal and streptozotocin induced diabetic (antihyperglycaemic) rats. The ethanolic extract (100 mg/kg) reduced the blood glucose of normal rats.<sup>[34]</sup>

**4. Vata (*Ficus bengalensis*)****Antidiabetic activity**

A dimethoxy derivative of leucocynidin, 3-O-beta-D-galactosyl cellobioside was also isolated and its antidiabetic activity has been demonstrated.<sup>[35]</sup>

**5. Udumber (*Ficus glomerata*)****Antidiabetic activity**

Methanolic extract of the stem bark in dose of 200 and 400 mg/kg orally lowered the glucose level in normal



and alloxan induced diabetic rats. The activity was also comparable to that of the effect produced by a standard antidiabetic agent, glibenclamide (10 mg/kg) proving its folklore claim as antidiabetic agent.<sup>[36-38]</sup>

## 6. *Ashvattha (Ficus religiosa)*

### Hypoglycemic activity

Sitosterol-D-glycoside was isolated from the root bark of *F. glomerata* and *F. religiosa*, which has a per oral hypoglycemic activity.<sup>[39]</sup>

## 7. *Jambu (Syzygium cumini)*

### Antidiabetic activity

Different parts of the jambolan especially fruits, seeds and stem bark possess promising activity against diabetes mellitus and it has been confirmed by several experimental and clinical studies. In the early 1960s to 1970s, Chirvan-Nia and Ratsimamanga<sup>[40]</sup>, Sigogneau-Jagodzinski et al<sup>[41]</sup>, Lal and Choudhuri<sup>[42]</sup>, Shrotri et al<sup>[43]</sup>, Bose and Sepha<sup>[44]</sup> reported the antidiabetic activity of various parts of jambolan in diabetic animals.

### III) Probable mode of action of *Ashmaribhedana Dravya*

Kidney stone (*Mutrashmari*) is a condition that develops due to an imbalance of *Vata* and *Kapha Dosh*a and this causes *Sanga* (obstruction in the urinary bladder) leading to problems in micturition. As in most of the *Dravya* there is predominance of *Tiksna Guna* & *Tikta, Kashaya Rasa*. Due to *Tiksna Guna* they cause disintegration of stones and prevent assimilation of *Kapha Dosh*a. *Tikta* and *Kashaya Rasa* pacify *Kapha Dosh*a. Due to *Ruksha, Tikshna Guna* and *Ushna Veerya* they prevent formation or accumulation of stones. Along with these actions *Ushna Veerya* of these drugs also aids in diuresis.

### Experimental evidence of *Ashmaribhedana Dravya*

#### 1. *Gorakshaganja (Aerva lanata)*

##### Antirolithiatic activity

The isolated quercetin and betulin from *A. lanata* have shown mild diuretic effect as well as antirolithiatic effect by significantly reducing the size of calculi in the

kidneys and enhancing the excretion of calcium, phosphate, oxalate while maintaining the level of magnesium, which is reported to be one of the calculi inhibiting factors.<sup>[45]</sup>

## 2. *Varuna (Crataeva nurvala)*

### Antirolithiatic activity

*C. Nurvala* contains active constituent Lupeol, which is very well known for its antirolithiatic activity through anti-oxaluric and anti-calciuric effect.<sup>[46]</sup>

### IV) Probable mode of action of *Madhumehahara Dravya*

It was observed that most of the drugs possessed *Katu, Tikta, Kashaya Rasa, Ushna Veerya, Katu Vipaka* and *Laghu, Ruksha Guna*. Most of them exhibited *Kapha-Pittaghna* property.

*Katu Rasa* possess *Guna* like *Laghu* and *Ruksha* which aids the *Shoshan* of *Kleda, Kapha, Mutra* present in body. As *Ushna Veerya* being opposite to the *Kapha* and *Kleda (Sheeta Guna)* does *Samprapti Vighatana*. So, *Dravya* like *Karavellaka* can be used in *Kaphaja Prameha*.

*Pitta* possesses *Ushna, Tikshna Guna*. So, the *Dravyas* like *Bijaka* possessing *Sheeta Veerya* may be used in *Pittaja Prameha*. *Kashaya* and *Tikta Rasa* does the *Kleda* and *Meda Shoshana*. *Laghu, Ruksha Guna* helps to combat the *Dravatah Vriddhi* of the *Pitta Dosh*a.

### Experimental evidence of *Madhumehahara Dravya*

#### 1. *Bimbi (Coccinia indica)*

##### Hypoglycemic activity

- The juice of the roots and leaves is used to treat diabetes and the aqueous and ethanolic extracts of the plant exhibit hypoglycemic action.<sup>[47]</sup>
- *C. indica* leaves have been shown to stimulate insulin secretion in diabetic rats.<sup>[48]</sup>
- Flavonoids and glycosides present in *C.indica* leaves are reported to have antidiabetic effects.<sup>[49]</sup>

#### 2. *Bijaka (Pterocarpus marsupium)*

##### Antidiabetic activity

- *Pterocarpus marsupium* is reported to have not only hypoglycemic property but also  $\beta$ -cell

protective and regenerative properties<sup>[50]</sup>, effects have been attributed to the flavonoid content in the plant.

- Complete restoration of normal insulin secretion and regeneration of beta cells have been reported in various experimental models of diabetes.<sup>[51-52]</sup>
- The blood sugar lowering activity has been endorsed to be due to the presence of tannates in the extract of the plant. Antihyperlipidemic activity is contributed probably to the marsupin, pterosupin, and liquiritigenin present in the plant.<sup>[53]</sup>
- Epicatechin has been shown to have insulinogenic property by enhancing insulin release and conversion of proinsulin to insulin. Epicatechin has also been shown to possess insulin like activity.<sup>[54-55]</sup>

### 3. Karavellaka (*Momordia charantia*)

#### Antidiabetic activity

- Bitter gourd contains bioactive substances with antidiabetic potential such as vicine, charantin, and triterpenoids along with some antioxidants.<sup>[56]</sup>
- Studies have shown that *Momordia charantia* can repair damaged  $\beta$ -cells thereby stimulating insulin levels<sup>[57]</sup> and also improve sensitivity/signaling of insulin.<sup>[58]</sup>
- Bitter gourd is also reported to inhibit absorption of glucose by inhibiting glucosidase and suppressing the activity of disaccharidases in the intestine.<sup>[59]</sup>

#### V) Probable mode of action of *Mutraveerajneeya Dravya*

As we know in *Ksharameha*, *Neelameha*, *Kalameha*, *Haridrameha*, *Manjishthameha* & *Raktameha* the mainly *Dosha* involved is *Pitta Dosha*. These drugs mainly pacify the *Pitta Dosha*. Most of the drugs are *Madhura*, *Tikta* & *Kashaya* which pacify *Pitta Dosha* while *Tikta* and *Kashaya Rasa* pacify *Kapha Dosha*. By pacifying the *Pitta* & *Kapha Dosha* these drugs help in maintaining the *Prakruta Varna* of *Mutra* i.e., reduces *Avila Mutrata*.

Also, *Sheeta Veerya* & *Madhura Vipaka* of some drugs does *Prasadana* of *Pitta* & *Rakta Dosha*. By pacifying the *Pitta* & *Rakta Dosha* these drugs help in maintaining the *Prakruta Varna* of *Mutra*. So *Mutraveerajneeya* drugs can help in-

- Normalizing urine color
- Reducing the urine turbidity
- Slight reduction in urine Ph
- Urine specific gravity
- Urine ketone bodies
- Urine protein

#### Clinical evidence of *Mutraveerajneeya Dravya*

*Padm* (*Ishat Shwet Kamal*), *Utpal* (*Ishat Neel Kumud*), *Nalin* (*Ishat Rakt Kamal*), *Kumud*, *Soganghik* (*Rakt Kumud*), *Pundreek* (*Shwet Kamal*), *Shatpatra*, *Madhuk*, *Priyangu*, *Dhatki Pushpa* decoction was prepared from these drugs and clinical study was conducted to assess the efficacy of *Mutraveerajneeya Mahakashaya* in *Avilmutrata* of *Prameha* (Type 2 Diabetes Mellitus).<sup>[60]</sup>

#### CONCLUSION

*Ayurvedic* herbs offer valuable support in managing urinary system diseases by providing natural remedies that promote kidney function, alleviate symptoms and maintain urinary tract health viz

- ***Mutravirechaneeya* drugs:** These drugs mainly act as diuretics but can also be used as an adjuvant therapy in diseases like urinary tract infection, Benign prostatic hyperplasia (BPH), Urolithiasis, Anuria, Oliguria, Azotaemia, Retention of urine, Cystitis etc. Apart from urinary system disorders they are also helpful in oedema, ascites, pleurisy etc.
- ***Mutrasangrahaneeeya* drugs:** These drugs mainly act as antidiuretics but can also be used as an adjuvant therapy in diseases like Polyuria, Diabetes insipidus, Diabetes mellitus, Urine incontinence, dribbling etc. Apart from urinary system disorders they are also helpful in *Atisara*, *Grahani*, *Raktapitta*, *Arsha* etc.

- **Ashmaribhedana drugs:** These drugs prevent formation of different type of stones like oxalate stones, uric acid stones, phosphate stones, spermolith.
- **Madhumezahara drugs:** These drugs act in all types of *Prameha* like Diabetes insipidus Diabetes mellitus, Diabetic glycosuria, lipiduria, biliuria etc.
- **Mutraveerajneeya drugs:** These drugs mainly maintain the normal colour of urine but can also be used as a adjuvant therapy in diseases urinary tract infections, diabetes, chyluria, preeclampsia, STD (Chlamydia, Gonorrhoea, Vaginitis etc.), pyelonephritis, cystitis, diabetic ketoacidosis, proteinuria etc.

Incorporating these herbs singly or in combination into one's healthcare regimen can contribute to improved urinary system function and overall well-being.

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